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(54) Abstract Title

Releasable coupling between handle and tool bit

(57) A joint section 11 on a handle 10 is interchangeably connected to the shank of a tool bit 40. The shank is received in a space 14 within the joint section 11. A ball 21 in the joint section can partially enter a recess 41 in the shank. Preferably the joint section comprises either two separated plates 12, 13 or a cylinder. Preferably the ball 21 is held in position by a rod 23 having a spring 22 mounted on it. The tool is either a shovel or a chisel.

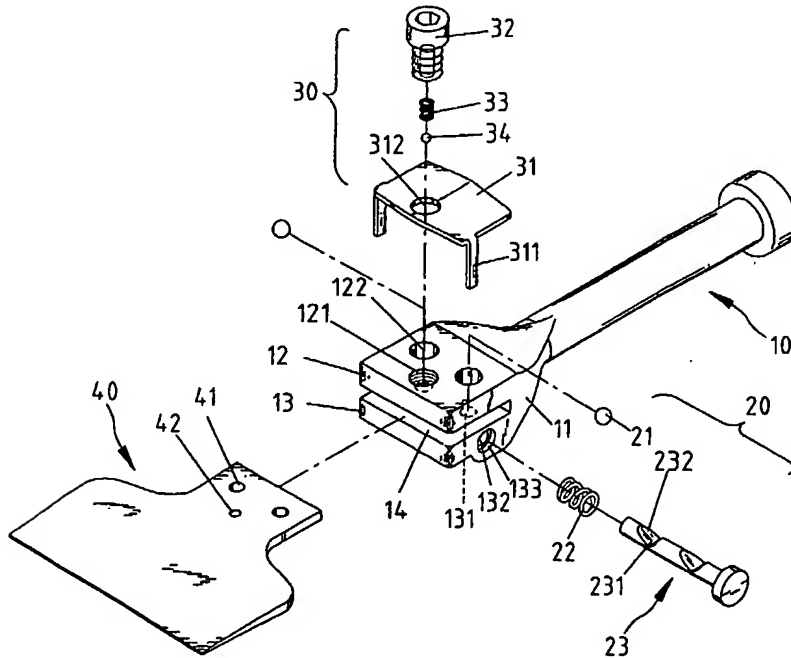


Fig. 2

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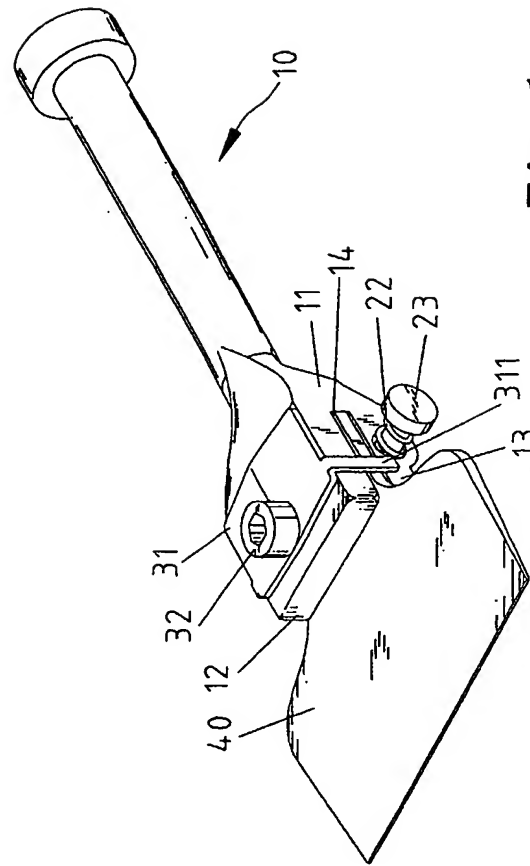


Fig. 1

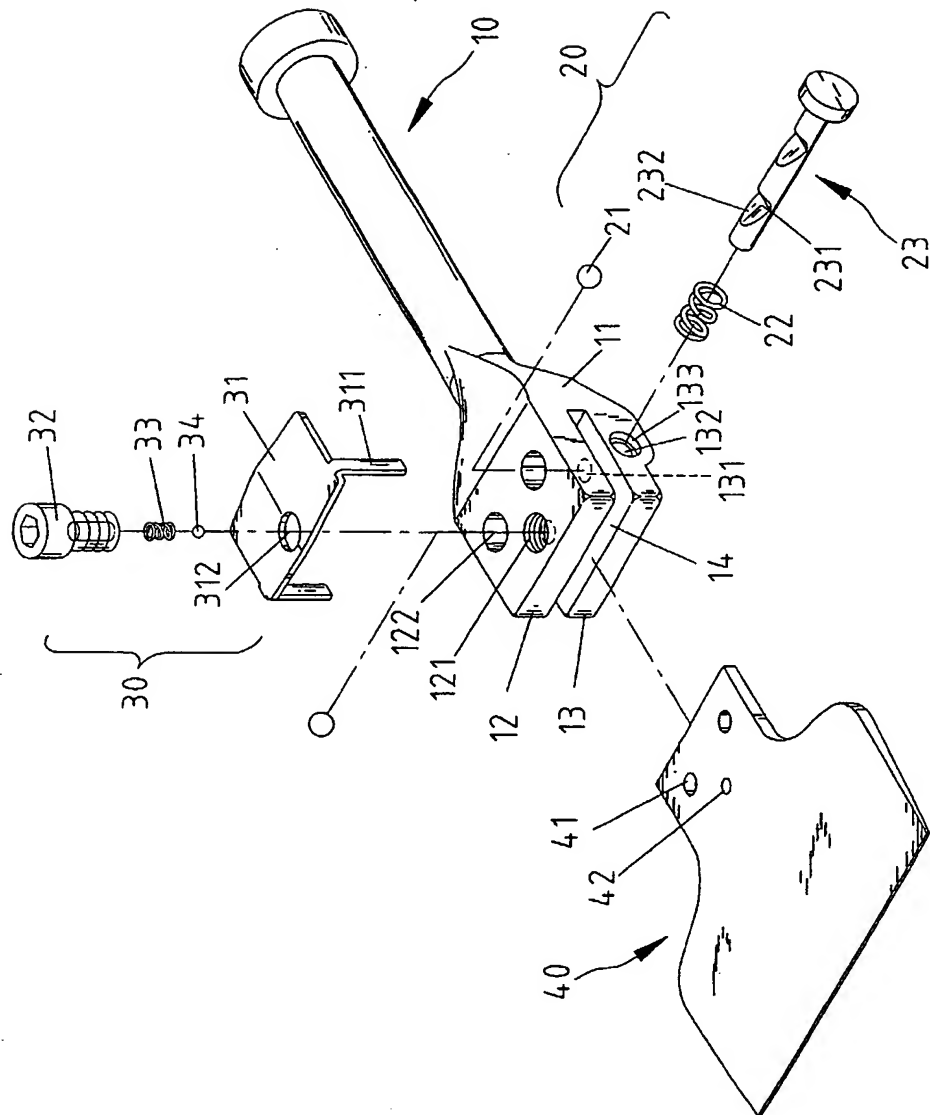


Fig. 2

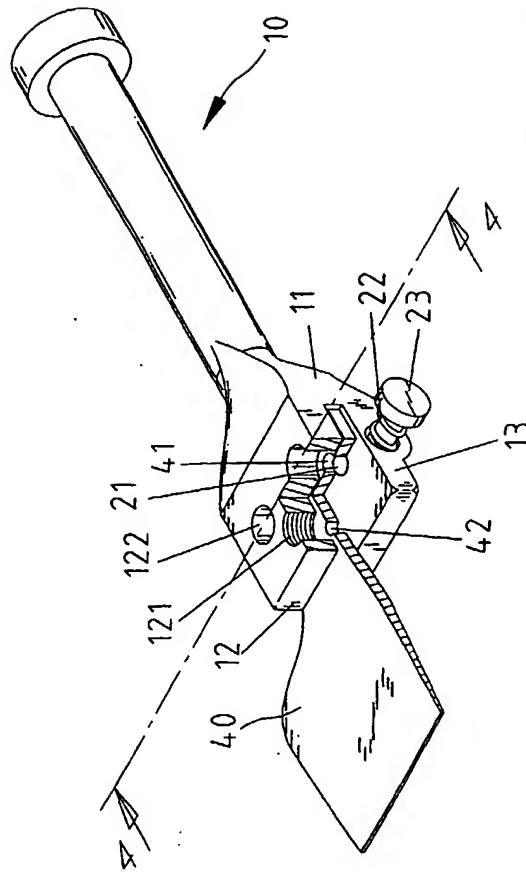


Fig. 3

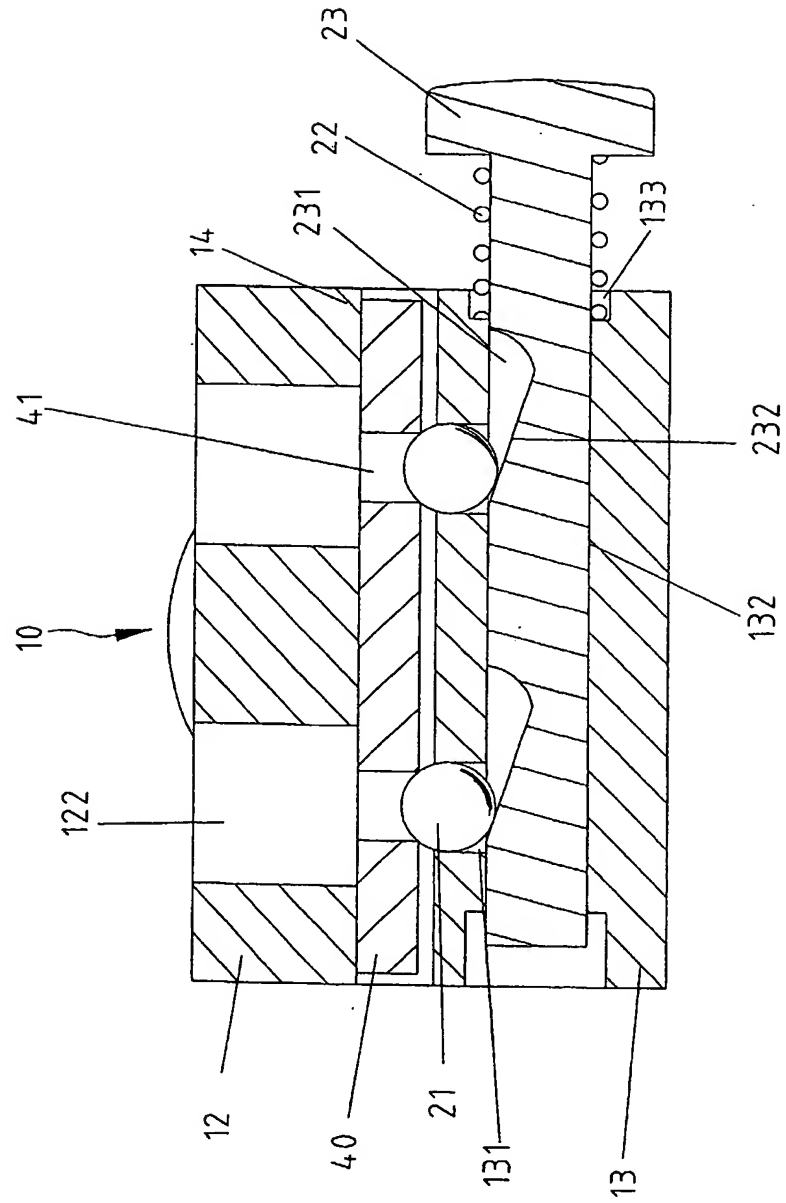


Fig. 4

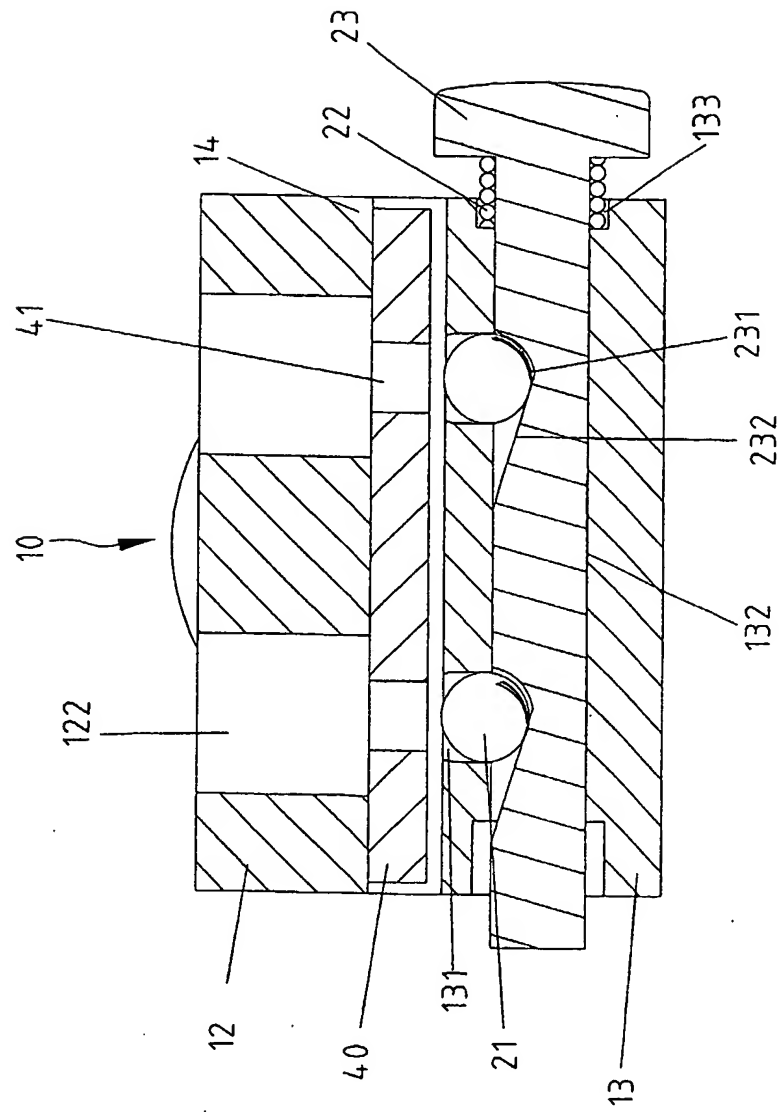


Fig. 5

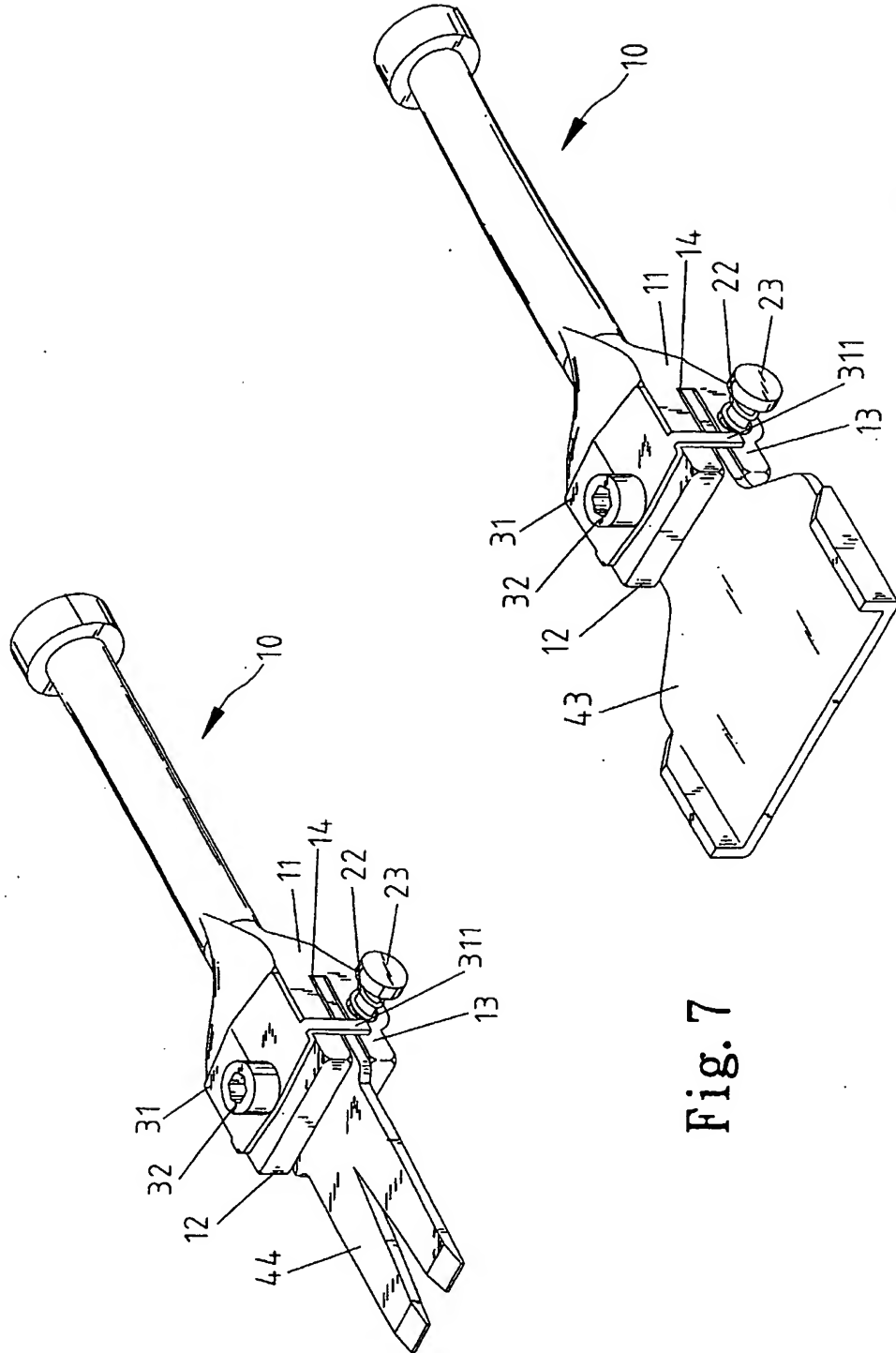


Fig. 6

Fig. 7

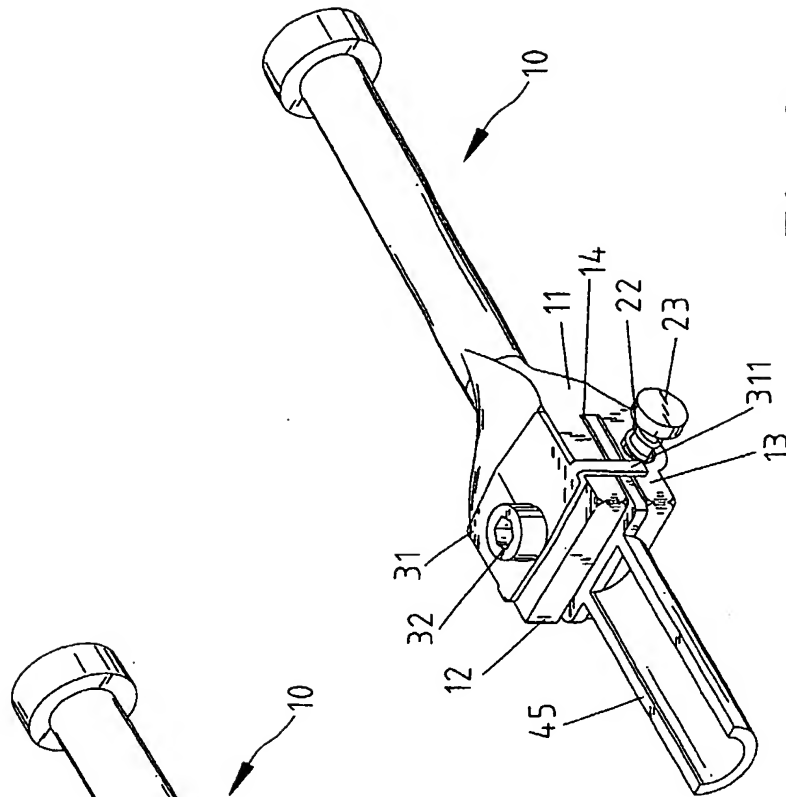


Fig. 8

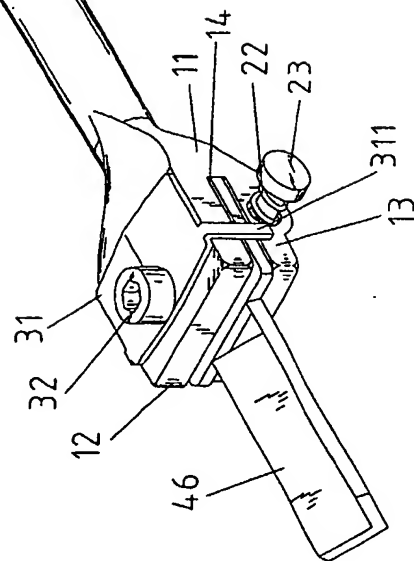


Fig. 9

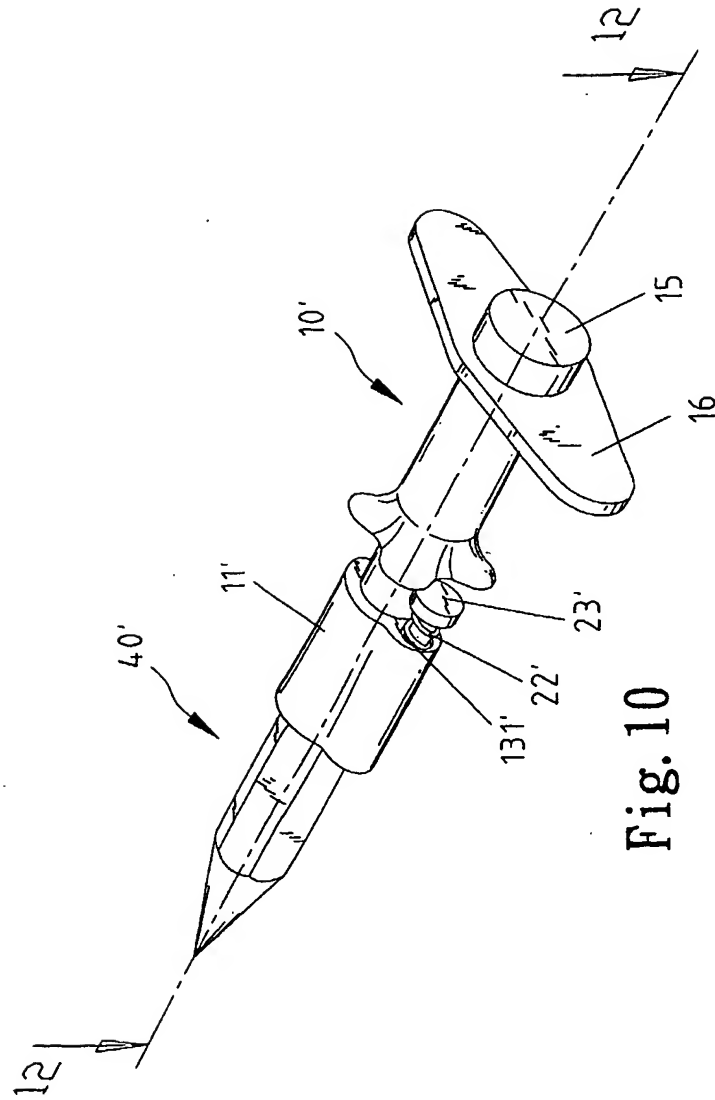


Fig. 10

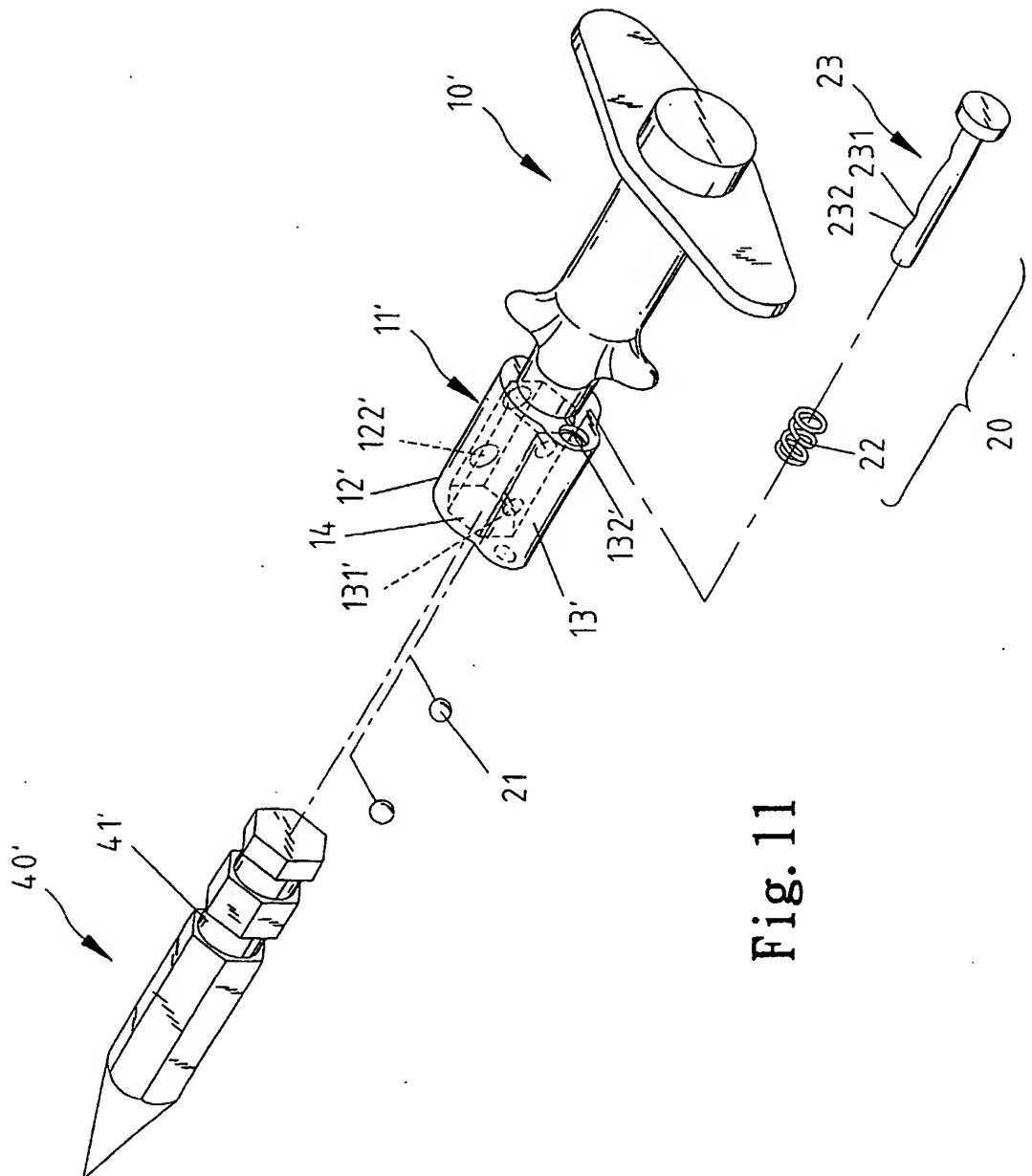


Fig. 11

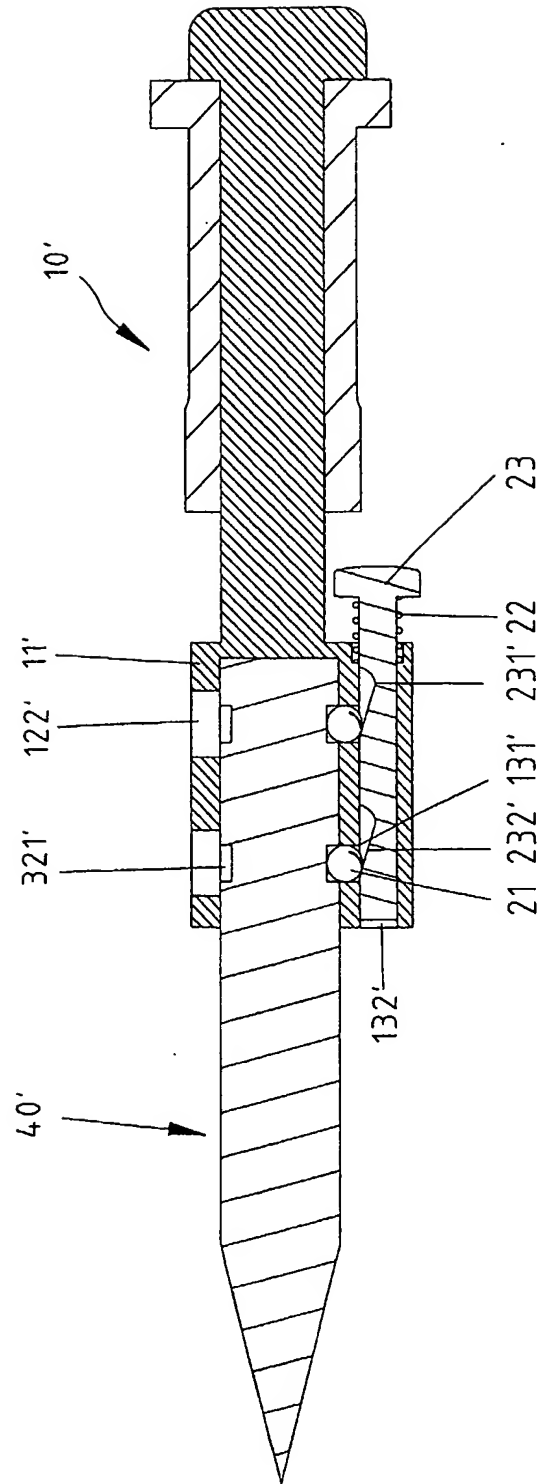


Fig. 12

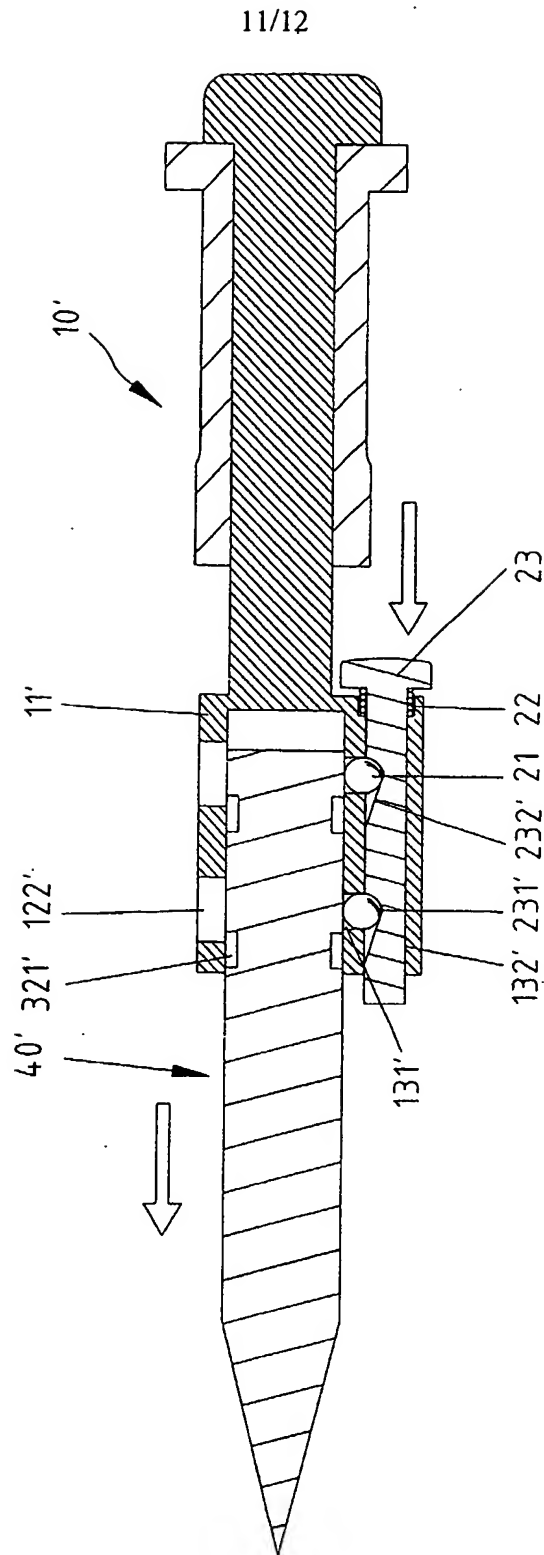


Fig. 13

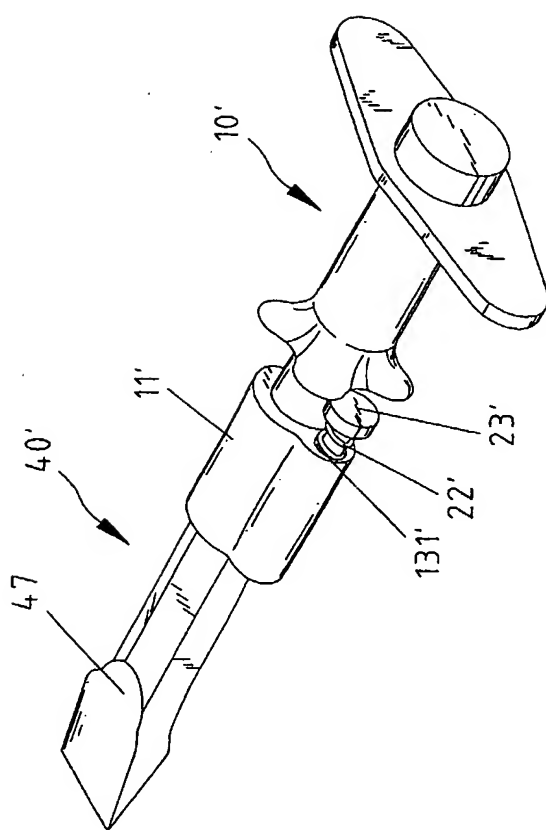


Fig. 14

1 **Combination of Tool Bit with Handle**

2
3 The present invention is related to a tool and more particularly to a tool including a
4 handle for connection with a tool bit in a releasable manner.

5
6 There have been various gardening tools such as shovels and rakes. Conventionally,
7 such a tool includes a tool bit and a handle. Generally, the tool bit includes an insert
8 extending from an edge thereof. The insert of the tool bit is inserted in the handle
9 that is made of wood or plastics. Sometimes, the tool bit is merged with the handle.
10 Such a tool requires a large space for storage thereof since the handle extends from
11 the tool bit.

12
13 There has been a foldable tool consisting a tool bit and a handle connected with the
14 tool bit in a foldable manner. The handle is extended from the tool bit in use. The
15 tool bit and the handle can be folded for storage. The foldable tool requires a small
16 space for storage thereof. Each tool bit is securely connected with a specific handle.
17 Therefore, two tools, such as a shovel and a rake, include two handles. However,
18 two handles are more than a single user needs for he or she does not use two tools at
19 the same time.

20
21 The present invention is therefore intended to obviate or at least alleviate the problems
22 encountered in prior art.

23
24 It is an objective of the present invention to provide a tool including a handle for
25 connection with a tool bit in a releasable manner.

1
2 It is an objective of the present invention to provide a tool assembly including a
3 handle for selective connection with one of many tool bits in a releasable manner.
4
5 According to the present invention, a tool includes a tool bit and a handle. The tool
6 bit includes a shank formed at an end thereof. The handle includes a joint formed at
7 an end thereof for connection with the shank of the tool bit in a releasable manner.
8 The joint defines a space for receiving the shank of the tool bit. The shank of the
9 tool bit defines at least one recess. The joint includes at least one ball that can
10 partially enter the at least one recess defined in the shank of the tool bit.
11
12 In an aspect, the joint includes first and second plates separated from each other by
13 the space. The second plate defines at least one hole in communication with the
14 space. The at least one hole defined in the second plate receives the at least one ball,
15 and includes an end of a reduced dimension so as to retain the at least one ball therein.
16
17 The second plate defines a tunnel in communication with the at least one hole. The
18 rod can be inserted in the tunnel so as to push the at least one ball into engagement
19 with the at least one recess defined in the shank of the tool bit.
20
21 The rod defines at least one recess with a slope. The at least one ball is partially
22 received in the at least one recess defined in the rod for preventing escape of the rod
23 from the joint. The rod can slide between a first position and a second position. In
24 the first position, the slope pushes the at least one ball into engagement with the at
25 least one recess defined in the shank of the tool bit. In the second position, the at

1 least one ball falls in the at least one recess defined in the rod so as to completely
2 leave the recess defined in the shank of the tool bit.
3
4 A spring may be mounted on the rod. The rod includes a head so that the spring is
5 compressed between the joint and the head of the rod.
6
7 In a second aspect, the joint includes a cylinder in which the space is defined. The
8 cylinder defines at least one hole in communication with the space. The at least one
9 hole defined in the cylinder receives the at least one ball, and includes an end of a
10 reduced dimension so as to retain the at least one ball therein.
11
12 The joint includes a second cylinder integrated with the first cylinder. The second
13 cylinder defines a tunnel in communication with the at least one hole defined in the
14 first cylinder. The rod can be inserted in the tunnel so as to push the at least one ball
15 into engagement with the at least one recess defined in the shank of the tool bit.
16
17 The rod defines at least one recess with a slope. The at least one ball is partially
18 received in the at least one recess defined in the rod for preventing escape of the rod
19 from the joint. The rod can slide between a first position and a second position. In
20 the first position, the slope pushes the at least one ball into engagement with the at
21 least one recess defined in the shank of the tool bit. In the second position, the at
22 least one ball falls in the at least one recess defined in the rod so as to completely
23 leave the recess defined in the shank of the tool bit.
24
25 The tool may include a spring mounted on the rod. The rod includes a head so that

1 the spring is compressed between the joint and the head of the rod.
2
3 The handle may include a block formed at a second end to be hit by a hammer. The
4 handle may include a protective element formed thereon near the block in order to
5 protect a user's hand when hitting the bock with a hammer in the other hand.
6
7 Fig. 1 is a perspective view of a tool including a handle for connecting with a tool bit
8 in a releasable manner according to the present invention;
9
10 Fig. 2 is an exploded view of the tool shown in Fig. 1;
11
12 Fig. 3 is a perspective view of the tool shown in Fig. 1 without a cover;
13
14 Fig. 4 is a cross-sectional view taken along a line 4-4 in Fig. 1;
15
16 Fig. 5 is similar to Fig. 4 except for showing the tool in another position;
17
18 Figs. 6~9 are perspective views of a handle engaged with various tool bits;
19
20 Fig. 10 is a perspective view of a tool including a handle for connecting with a tool bit
21 in a releasable manner according to a second embodiment of the present invention;
22
23 Fig. 11 is an exploded view of the tool shown in Fig. 10;
24
25 Fig. 12 is a cross-sectional view taken along a line 12-12 in Fig. 10;

1
2 Fig. 13 is similar to Fig. 12 except for showing the tool in another position; and
3
4 Fig. 14 is similar to Fig. 10 except for showing the handle in connection with a
5 different tool bit.
6
7 Referring to Figs. 1~5, according to a first embodiment of the present invention, a tool
8 includes a handle 10 for connection with a tool bit 40 in a releasable manner.
9
10 The handle 10 is formed with a joint 11 at an end thereof. The joint 11 includes a
11 first plate 12 and a second plate 13 separated from each other by a gap 14 of a
12 distance. The first plate 12 defines a threaded hole 121 and two holes 122.
13
14 The second plate 13 defines two holes 131 corresponding to the holes 122 defined in
15 the first plate 12. The second plate 13 defines a tunnel 132 in communication with
16 the holes 131. The second plate 13 defines a recess 133 of a greater diameter than
17 that of the tunnel 132.
18
19 A cover 31 includes two extensions 311 projecting in perpendicular thereto. A hole
20 312 is defined in the cover 31. A threaded bolt 32 is inserted through the hole 312
21 for engagement with the threaded hole 121, thus retaining the ball 34 in the threaded
22 hole 121. Furthermore, the cover 31 is securely mounted on the first plate 12 by
23 means of the threaded bolt 32 engaged with the threaded hole 121. The holes 122
24 are closed by means of the cover 31.
25

1 A rod 23 includes an enlarged head (not numbered) formed at an end thereof. The
2 rod 23 defines two notches 231 each including a slope 232.
3
4 In assembly, the spring 22 is mounted on the rod 23. The rod 23 is inserted in the
5 tunnel 132 so that the recesses 231 are aligned with the holes 131 as shown in Fig. 5.
6 Thus, two balls 21 can be put in the holes 131 through the holes 122. A tool (not
7 shown) can be inserted through each of the holes 122 in order to press an annular edge
8 at an upper end of one of the holes 131 in order to make its diameter smaller than that
9 of the balls 21. Thus, escape of the balls 21 from the holes 131 is prevented. An
10 end of the spring 22 is received in the hole 133.
11
12 The spring 22 is compressed between the second plate 13 and the head of the rod 23
13 for biasing the rod 23 away from the second plate 13. As shown in Fig. 4, a portion
14 of each of the balls 21 remains in one of the recesses 231, thus preventing escape of
15 the rod 23 from the tunnel 13.
16
17 A threaded bolt 32 defines a recess (not shown) in which a spring 33 and a ball 34 are
18 embedded so that they cannot escape from the threaded bolt 32. A portion of the ball
19 34 is exposed to the exterior of the recess defined in the threaded bolt 32. The
20 threaded bolt 32 is inserted through the hole 312 for engagement with the threaded
21 hole 121.
22
23 In use, the rod 23 is moved from the position shown in Fig. 4 to the position shown in
24 Fig. 5 so that the balls 21 fall in the recesses 231 and that the balls 21 are completely
25 moved from the gap 14 between the plates 12 and 13. Thus, a shank (not numbered)

1 of a tool bit 40 can be inserted in the gap 14 between the plates 12 and 13. The
2 shank of the tool bit 40 defines two holes 41. A recess 42 is defined in an upper
3 surface of the shank of the tool bit 40. When the holes 41 are aligned with the holes
4 131, the rod 23 is released so that the spring 22 pushes the rod 23 back to the position
5 shown in Fig. 4. The slopes 232 push the balls 21 upward so that each of the balls
6 21 partially enters one of the holes 41, thus holding the shank of the tool bit 40.

7
8 The rod 23 can be moved from the position shown in Fig. 4 to the position shown in
9 Fig. 5 in order to release the tool bit 41 for replacement with a tool bit 43 shown in
10 Fig. 6, a tool bit 44 shown in Fig.7, a tool bit 45 shown in Fig. 8 or a tool bit 46
11 shown in Fig. 9.

12
13 Referring to Figs. 10~14, according to a second embodiment of the present invention,
14 a tool includes a handle 10' and a tool bit 40''. The handle 10' includes at a first end
15 a joint 11' for connection with the tool bit 40''. The handle 10' includes at a second
16 end a block 15 to be hit by a hammer or the like. A protective element 16 is formed
17 on the handle 10' near the block 15 in order to protect a user's hand when he or she
18 hits the block 15 with a hammer in the other hand.

19
20 The joint 11' includes a first cylinder 12' and a second cylinder 13' integrated with
21 the first cylinder 12'. The first cylinder 12' defines two radial holes 122' and an
22 axial tunnel 14' in communication with the radial holes 122'. A connective portion
23 between the cylinders 12' and 13' defines two holes 131'. The second cylinder 13'
24 defines an axial tunnel 132'.

25

1 In assembly, a spring 22 is mounted on the rod 23 which is inserted in the tunnel 132'
2 so that the spring 22 is compressed between the second cylinder 13' and the head of
3 the rod 23. The recesses 231 are aligned with the holes 131'. Two balls 21 are
4 received in the holes 131' so that each of the balls 21 is partially received in one of
5 the recesses 231. A tool (not shown) can be inserted through the holes 122' in order
6 to hit annular edges around the holes 131' so as to trap the balls 21 in the holes 131'.
7 Each of the balls 21 is partially received in the recesses 231, thus preventing escape of
8 the rod 23 from the joint 11'.
9
10 The tool bit 40' includes a tip (not numbered) and a shank (not numbered) defining
11 two annular recesses 41'.
12
13 Referring to Fig. 12, the shank of the tool bit 40' is inserted in the tunnel 14'. The
14 spring 22 biases the rod 23 away from the second cylinder 13'. The slopes 232'
15 push the balls 21 upward. A portion of each of the balls 21 enters one of the annular
16 recesses 41', thus preventing escape of the tool bit 40' from the joint 11'.
17
18 The head of the rod 23 can be pressed to move the rod 23 from the position shown in
19 Fig. 12 to the position shown in Fig. 13. In the position shown in Fig. 13, the
20 recesses 231 are aligned with the holes 131' so that the balls 21 fall in the recesses
21 231. The balls 21 completely leave the annular recesses 41' to allow removal of the
22 tool bit 40' from the joint 11' for replacement with a tool bit 47 shown in Fig. 14.

1 Claims

- 2 1. A tool including:
- 3 • a tool bit (40; 40') including a shank formed at an end thereof; and
- 4 • a handle (10; 10') including a joint (11; 11') formed at an end thereof for
- 5 connection with the shank of the tool bit (40; 40') in a releasable manner.
- 6 2. The tool according to claim 1 wherein the joint (11; 11') defines a space (14; 14')
- 7 for receiving the shank of the tool bit (40; 40').
- 8 3. The tool according to claim 2 wherein the shank of the tool bit (40; 40') defines
- 9 at least one recess (41; 41') and the joint (11; 11') includes at least one ball (21)
- 10 that can partially enters the at least one recess (41; 41') defined in the shank of
- 11 the tool bit (40; 40').
- 12 4. The tool according to claim 3 wherein the joint (11) includes first and second
- 13 plates (12, 13) separated from each other by the space (14), the second plate (13)
- 14 defines at least one hole (131) in communication with the space (14), wherein the
- 15 at least one hole (131) defined in the second plate (13) receives the at least one
- 16 ball (21), and includes an end of a reduced dimension so as to retain the at least
- 17 one ball therein.
- 18 5. The tool according to claim 4 including a rod (23), wherein the second plate (13)
- 19 defines a tunnel (132) in communication with the at least one hole (131), wherein
- 20 the rod (23) can be inserted in the tunnel (132) in order to push the at least one
- 21 ball (23) into engagement with the at least one recess (41) defined in the shank of
- 22 the tool bit (40).
- 23 6. The tool according to claim 5 wherein the rod (23) defines at least one recess
- 24 (231) with a slope (232), wherein the at least one ball (21) is partially received in
- 25 the at least one recess (231) defined in the rod (23) for preventing escape of the

1 rod (23) from the joint (11), wherein the rod (23) can slide between a first
2 position where the slope (232) pushes the at least one ball (21) into engagement
3 with the at least one recess (41) defined in the shank of the tool bit (40) and a
4 second position where the at least one ball (21) falls in the at least one recess (231)
5 defined in the rod (23) so as to completely leave the recess (41) defined in the
6 shank of the tool bit (40).

7 7. The tool according to claim 6 including a spring (22) mounted on the rod (23),
8 wherein the rod (23) includes a head so that the spring (22) is compressed
9 between the joint (11) and the head of the rod (23).

10 8. The tool according to claim 4 wherein the tool bit (40) is a shovel.

11 9. The tool according to claim 3 wherein the joint (11') includes a cylinder (12') in
12 which the space (14') is defined.

13 10. The tool according to claim 9 wherein the cylinder (12') defines at least one hole
14 (131') in communication with the space (14'), wherein the at least one hole (131')
15 defined in the cylinder (12') receives the at least one ball (21), and includes an
16 end of a reduced dimension so as to retain the at least one ball (21) therein.

17 11. The tool according to claim 10 including a rod (23), wherein the joint (11')
18 includes a second cylinder (13') that is integrated with the first cylinder (12') and
19 defines a tunnel (132') in communication with the at least one hole (131') defined
20 in the first cylinder (12'), wherein the rod (23) can be inserted in the tunnel (132')
21 defined in the second cylinder (13') in order to push the at least one ball (21) into
22 engagement with the at least one recess (41') defined in the shank of the tool bit
23 (40').

24 12. The tool according to claim 11 wherein the rod (23) defines at least one recess
25 (231) with a slope (232), wherein the at least one ball (21) is partially received in

1 the at least one recess (231) defined in the rod (23) for preventing escape of the
2 rod (23) from the joint (11'), wherein the rod (23) can slide between a first
3 position where the slope (232) pushes the at least one ball (21) into engagement
4 with the at least one recess (41') defined in the shank of the tool bit (40') and a
5 second position where the at least one ball (21) falls in the at least one recess (231)
6 defined in the rod (23) so as to completely leave the recess (41') defined in the
7 shank of the tool bit (40').

8 13. The tool according to claim 12 including a spring (22) mounted on the rod (23),
9 wherein the rod (23) includes a head so that the spring (22) is compressed
10 between the joint (11') and the head of the rod (23).

11 14. The tool according to claim 9 wherein the tool bit (40') is a chisel.

12 15. The tool according to claim 14 wherein the handle (10') includes a block (15)
13 formed at a second end to be hit by a hammer.

14 16. The tool according to claim 15 wherein the handle (10') includes a protective
15 element (16) formed thereon near the block (15) in order to protect a user's hand
16 when hitting the block (15) with a hammer in the other hand.

17



INVESTOR IN PEOPLE

Application No: GB 0208733.6
Claims searched: 1-16

Examiner: Robert Black
Date of search: 23 September 2002

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): B4K KJR

Int Cl (Ed.7): B25G 3/28; B25F 5/02

Other: Online: EPODOC; WPI; PAJ

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	WO 89/04238 A1 (CHEVALIER) see especially figures 1 and 2, the abstract and WPI abstract 1989-165557	1-3 and 9

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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